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Equity research report on  
**Ford Motor Company: Looking for a 'charger'?**

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## **Abstract**

There is no doubt that the Electric vehicle is the future of the auto mobile industry and it has become a matter of survival for automobile industry if they don't delve into the Electric vehicle segment in the next 10 years. Hence it the current and future outlook of the Electric vehicle segment for any automotive company forms and important component for any company, especially for huge traditional OEMs like Ford who are dependent on Internal combustion vehicles are struggling to make the shift. I have dissected the curious case of Ford lacking a clear strategy for the EV segment despite been an innovation leader in this industry for more than 100 years. I have identified the possible reasons of Ford's murky strategy and how it would it evolve in future and how did it impact when forecasting the value of the company for the next 5 years. Lastly, I valued Ford as Equity as an option and EV/EBITA multiple.

Keywords: Electrification, internal combustion engines, government regulations, customer preference

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This report is part of the consolidated report (annexed) and should be read as an integral part of it.

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# 1 Introduction

EVs are poised to be the biggest growth driver of the automobile industry and are set to largely replace ICE vehicles within in the next 10-20 years. Like most automakers Ford also had big ambitions about EV. In 2016, it announced that it has planned to launch 30+ EV by 2025. However, they had to rescind their statement in 2019 as of 2019 they delivered only 4 vehicles EV vehicles and those 4 were hybrid vehicles rather than full E.V. It will only launch its first pure EV by 2021. We have analysed and tried to understand why Ford were not able to meet its EV commitment and how much impact would that have in the long run.

The segment is still in its nascent phase but just like every other industry a head start in R&D and innovation in the early stages gives an edge to the companies and they reap the ensuing competitive advantage for several years.

## 1.1 Ford's reactivity towards EV

Ford has been torpid in its EV approach. It only recently launched its first plug in EV (the Mach-E) and has just 4 hybrid vehicles in its lineup, all of which failed to compete with the likes of Tesla in the U.S., BYD in China and Toyota, BMW, Renault in Europe.

Ford's hybrid EV sales only constitute 0.38% of the total vehicles sold globally in 2019. It has the worst EV to total vehicles sold ratio among the 10 biggest automobile companies in this world.

Ford's and other U.S. automaker's lethargic approach towards EVs allowed Tesla to gain a market share of 81.6% in the segment as of 2019. It would be extremely difficult for Ford to claw back a piece from Tesla's pie as it is years behind it in terms of technology.

Ford's focus on its ICE segment will probably be good for the company's bottom line in the short- to medium-term, but the high opportunity cost is bound to catch up to them in the long-term in the form of lower future EV sales. EVs are expected to account for 10% of global automobile sales by 2026.

Ford's projections being on the lower end of the spectrum for 2026 imply that they are underprepared and will likely continue to trail the larger plug-in market even until the end of decade, 2030, when EVs are expected to make up almost 28% of the global automotive sales.

Ford's new CEO, Jim Farley, has admitted that Ford is still taking baby steps in the EV market, but has committed that market should expect a quick turnaround from the company given its historic R&D and financial prowess.

He also helmed the launch of Ford's first ever plug-in SUV, the Mustang Mach-E, which was announced under his predecessor, but saw a renewed focus under current management. It is set to compete against the likes of Tesla Model Y, Audi E-Tron, Volvo Polestar 2, etc.

The good news here is that despite the being late to the game, Ford hasn't come empty handed as Mach-E looks to be competitively specced and priced with a 300-mile range for its mid-tier, \$50,000 model. This pits it directly against the segment leader, Tesla's Model Y, which boasts of a 325-mile range at an identical price. Given the competition's slightly better range, superior technology and much more favorable brand perception, Ford will have to really go all out on the Mach-E's marketing efforts to start clawing back a reasonable share of the market. It's success with this platform will give investors important clues regarding the company's future in this critical segment.

## 2 Forecasting Ford Mustang Mach-E's sales

Ford Mustang Mach E, its first EV is going to be launched in Q1 2021 in the U.S and Europe, china market. Ford has planned to produce 50,000 units for the year with each unit at an average retail price of \$50,000. The vehicle has already garnered a lot of interest but it would have to face stiff competition from the likes of Tesla, BMW,Audi and a bunch of start-ups.

According to the pre booking data Ford has already got 41,000 reservations. It is expected that would reach its full limit by the end of the year. According to Ford's history on average 70% people who reserve buy the car and the remaining 30% could easily be sold once its officially launched. Hence, we expect that Ford will be able to sell out all 50,000 vehicles as it's the current demand comfortably exceeds that

<i>Vehicles sold</i>	<i>Average price (\$)</i>	<i>Revenue (\$ million)</i>
50,000	50,000	2500

The forecasted revenue for this vehicle is 2500 million for 2021 which is 2.1% of the total projected revenues for the company, However the catch here is that Ford is likely to make a loss on this model due to high fixed costs associated with it and no economies of scale has not been achieved at an optimum level for it. Moreover, the selling and administrative expenses would be also high. Hence it is likely that in terms of net profit the \$ 500 million dollar of impact would be nullified or to be 1.5%-2% in the best-case scenario.

Another important point is EVs have a high depreciation on its Maximum retail price as the technology keeps evolving every year and it is expected that Mach-E's 1<sup>st</sup> model would only last for 2 years in the retail showrooms. Ford had expected a depreciation of 20% which would dent its profit further.

Hence assimilating this information into our valuation. Ford Mach E sales would not cause any major changes in the company Forecast for the next few years. Ford would have to launch more EVs and decrease its fixed costs to be able to add some value.

## 2.1 Impact on valuation

All in all, while the Mach-E looks promising, the overall future of the company in this segment is still quite uncertain. While Ford is quick to push out statements to shareholders regarding its plans about EVs, those statements are seldom followed by timely, orderly action. This is the reason why we chose to segment our revenue forecast by geography instead of drivetrain. However, our growth rates still implicitly account for our view of Ford's future in the EV segment in each of its major geographical market. EVs will play the biggest role in North America, then in Europe, and then finally in China. Their impact in Ford's other market will likely be immaterial in the long-run due to their economic make-up and their miniscule contribution to Ford's current sales. According to our estimates, Ford has planned to launch roughly 40 EVs globally over the next 5-10 years, including an ecosystem of electric commercial vehicles. However, only 3 have been confirmed so far. Thus, taking the current pace of development into account, we have estimated that it will sell around 200,000 EVs globally by 2026, which would account for just ~4.5% of its sales by volume. This is quite low compared to the projected industry average of 10%.

Our approach would have been different if Ford had a concrete roadmap for EVs which it faithfully followed and thus had some positive results to show for itself. In that case, EVs would have a higher % in the total sales and maybe its long-term growth rate would have been above the industry average.

### 3 Final remarks on Ford's EV segment

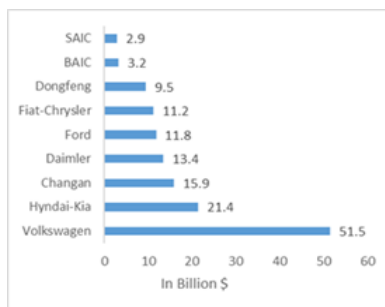


Figure 1 EV R&D spending by companies

For Ford to up its EV game a radical change would be required in its strategy. Ford's priority now should be a comprehensive follow up after its promising debut by aggressively pursuing R&D in the field, especially in battery technology as that is one of the biggest hurdles to mass adoption of the platform. Launching a few more EVs would just not cut it. Other than the traditional OEMs, it is competing against cutting edge startups like Nio, Rivian, Xipeng, Faraday, etc., and lot of them are backed by large VCs with deep pockets and are laser-focused on this platform and its intricacies.

There is a possibility that we could see Ford acquiring a leading EV startup because that would be the fastest way to compensate for its slow start. In that case the valuation metrics for Ford's EV market could have been different. However, the valuation of leading startups currently is sky high and Ford would likely to shell out billions of dollars that could already put more pressure on its high debt and the \$11billion restructuring plans.

Moreover, it already bought a minor stake in Rivian for \$500 million USD and had supposedly planned to use its EV technology for its luxury brand Lincoln to launch a Lincoln EV by 2021 but that project has been put on the hold this year and the vehicle would not be launched before 2023. Ford's partnership with Rivian has been quite nontransparent and there are no concrete signs improvements in Ford's future EV business through this partnership hence while forecasting our sales we assumed that Ford would not acquire any major EV startup and bulk of its EV research and sales would be under its own brand.

Ford Mach-E looks promising but the EV future of the company looks uncertain. Ford keeps the shareholders updated with the new statements about EV, but those statements have not resulted in concrete actions and the ones that did have been delayed. Due to this reason, we have decided not to create a specific separation of sales of EV in our valuation model and decided to split the revenues according to the geography. However, in the growth rate of our geographic distribution of revenues we have taken Ford's EV forecast into account but given the small percentage of EV into the total vehicle sales it is the performance of the ICE vehicles which would drive the growth of the company until 2026.

Our approach would have been different if Ford had a concrete roadmap for EV with some positive results to show. In that case EV would have a higher % in the total sales probably in double figures and Ford's growth rate would have been above industry average



## 4 The Black-Scholes model: Valuing equity as an option

Given the unique combination of a business facing major industrial headwinds, a generational economic shock and the high level of financial leverage involved, we thought it would be interesting to value Ford's equity as a derivative, specifically a call option, using the Black-Scholes model.

This method is useful when analyzing firms that are struggling and are in a distress or near-distress state (Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset*, 2012). The reasoning is that the underlying asset in this case is the enterprise value of the firm computed using a DCF and the strike price is the face value of the firm's outstanding debt. A distress/near-distress state means that the value of the asset (in this case, Ford Motor Co.) is not too far from the strike price (Ford's total financial obligations), and therefore the equity can be reasonably valued as a call. It is crucial that both these numbers are reasonably close to each other. This is not the case when the firm in question is well run and their enterprise value far outweighs their total debt burden. In such cases, the total value of the underlying assets is too far away from the strike price for the model to be of any practical use as it would be equivalent to calculating the value of an absurdly far-OTM option.

The duration of the call in this case was the face value weighted average duration of Ford's outstanding bond issues, and the variance of the underlying asset was taken from (Damodaran, *Standard Deviations by Sector* (U.S.), 2020).

Years to maturity	1	2	3	4	5	10 or more	Total
Face value of debt	53964	32163	23727	10681	10636	24136	155307
Discount factor @ r	0.9984	0.9968	0.9952	0.9936	0.9920	0.9841	
Face value/Total	0.35	0.21	0.15	0.07	0.07	0.16	
Weighted average duration of debt	0.35	0.41	0.46	0.28	0.34	1.55	<b>3.39</b>

*Table 1: Calculating the maturity of the call.*

<i>Inputs</i>	
Value of the underlying asset = S = Value of the firm (\$ million)	211893
Exercise price = K = Face value of debt (\$ million)	155307
Life of the option = t = weighted average duration of debt (in years)	3.39
Variance in the value of underlying assets = $\sigma^2$ = Variance in firm value <sup>1</sup>	3.66%
Risk-free rate = r = U.S. Treasury bond rate corresponding to option life	0.16%

*Table 1: Final inputs into the Black-Scholes model.*

The above inputs result in an equity value of \$63.799B, which translates to a basic price per share of \$16.06 which drops down marginally to \$15.93 when accounting for full dilution. These values are roughly 75% higher than the current market price and ones yielded by our DCF valuation.

When thinking about the reasons behind such a big difference, it is important to keep in mind the underlying mechanics at play here. First, the outputs of these two models are not independent as the DCF valuation is one of the inputs into the option valuation. Second, the Black-Scholes model makes certain assumptions about the prices (normally distributed), returns (lognormally distributed) and volatility (constant for the duration of the option) in the market, all of which make more sense when looking at the aggregate behaviour of the market but do not necessarily reflect adequately the nuances of every individual business and security. This lack of specificity is why the output of the Black-Scholes model here should be taken with a healthy dose of skepticism. It is, instead, best viewed as representing a right-tail outcome for the company.

## 5 Valuation using EV/EBITA multiple

To gain a more market-based perspective on Ford with respect to its peers, we valued it using the EV/EBITA multiples. On our choice of multiple, from (McKinsey & Company, 2015): -

“Using enterprise value to EBITA (or NOPLAT) rather than a P/E eliminates the distorting effect of different capital structures, nonoperating assets, and nonoperating income statement items (such as the nonoperating portion of pension expense). Any item that isn’t a helpful indicator of a company’s future cash-generating ability should be excluded from the calculation of the multiple.”

Company	EV/EBITA
Ford	65.52
GM	31.02
FCA	34.35
Volkswagen	42.30
Daimler	65.15
Toyota	77.40
Mean	52.62
Median	53.72
Ford EV = Median * EBITA	122.11
Less: Debt	-113.73
Equity (\$ billion)	8.38
Shares outstanding (in billion)	3.90
Price per share (\$)	2.15

Table 3: Valuing Ford using EV/EBITA multiple for 2020Q3.

This valuation stands firmly in contrast to the Black-Scholes one as it represents a left-tail outcome for the company, albeit one that is not as extreme as the one we considered in our sensitivity analysis during the DCF. However, despite having a different output, it suffers from the same weaknesses as that of the Black-Scholes, namely an overreliance on current market dynamics which in-turn reflect both systematic and idiosyncratic risks, and it is very difficult to separate them by just looking at current prices. Thus, it makes sense to take this value with a grain of salt too.

## Annexure

# Ford Motor Company

Automotive sector

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## Company report

4 January 2021

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### Ford Motor Company: Going further... slowly?

*Can the old dog learn new tricks?*

- We initiate the coverage of Ford Motor Company (NYSE: \$F) with a 'Hold' rating and a price target of \$9.22 for the end of FY 2021.
- Continued strength in the pick-up truck and SUV segment in North America is cancelled out by sluggish progress on EVs.
- Strong liquidity position (~\$25B) means the company is well positioned for all its operational, investment and financing needs.
- Projected 5y revenue CAGR is 1.61% on the back of 3% annual improvement in revenue per vehicle in the U.S.
- Annual market share loss is set to slow down to 1.05% in America and 2.55% in Europe due to introduction of hybrid and electric versions of popular models.
- Long-term top-line growth rate will tend towards industry average of ~2%.
- DCF valuation with a WACC of 5.33% yields a price of \$9.32/share, while the Black-Scholes model gives us a value of \$16.20/share and valuation using the EV/EBITA multiple leads to a price of \$2.15/share.
- Average price/share from all three methods = \$9.22.

Recommendation	Hold
Previous recommendation	-
Price target for FY 2021 (\$)	9.22
Previous target	-
Price as of 30/12/2020 (\$)	8.86
Upside/downside	+4.06%
52-week range (\$)	3.96 to 9.57
Market cap (\$ billion)	35.19
Shares outstanding (billion)	3.90



(\$ million)	2021	2022E	2023E
Revenues	153650	155249	157313
Costs	144778	145692	146663
EBITA	8871	9557	10650
%	5.77	6.16	6.76
Net profit	2582	3124	3987
ROIC (%)	2.27	4.36	4.73

THIS REPORT WAS PREPARED EXCLUSIVELY FOR ACADEMIC PURPOSES BY ADITYA AGARWAL AND AAYUSH AMOD KATIYAR, MASTER'S IN FINANCE STUDENTS OF THE NOVA SCHOOL OF BUSINESS AND ECONOMICS. THE REPORT WAS SUPERVISED BY A NOVA SBE FACULTY MEMBER, ACTING IN A MERE ACADEMIC CAPACITY, WHO REVIEWED THE VALUATION METHODOLOGY AND THE FINANCIAL MODEL.

(PLEASE REFER TO THE DISCLOSURES AND DISCLAIMERS AT END OF THE DOCUMENT)

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# 1 Executive summary

Ford Motor Company is in a precarious situation right now. One on hand, it is facing a massive headwind in the form of an aggressive industry-wide push towards electrification which challenges the firm's core business model that it has worked so hard to perfect over the past several decades. On the other, it is also benefitting from a significant tailwind in the form of continued robust demand of its current ICE-based bestsellers, particularly its pick-up trucks in the U.S. Even on a macroscopic scale, things are finely poised as a record shock demand-side shock has prompted governments towards record monetary and fiscal stimulus.

The company also appointed a new CEO, CFO, and several other top executives across its corporate structure in October 2020 to try and breath fresh life into the conference room. However, the new management has opted to play it safe in the very short time that the investors have known them, which begs the question: can they really inspire change in this fabled, yet aging American giant?

The answer to this question is central to any investment thesis revolving around Ford as the previous management was let go due to a messy and subpar execution of their ambitious \$11B global restructuring, which even though now halfway through, was failing to produce tangible results. One of its biggest failings was Ford's sluggish pace in reallocating resources towards electric vehicles.

Turning our attention to the current situation, Ford recently relaunched a modern take on its iconic Bronco line. It also finally launched its first plug-in electric SUV, Mustang Mach-E, earlier this year, and hybrid and electric versions of its bestseller pick-up truck, F-150 are set to go on sale in 2020H2. The customer's reception to these products will play a large part in determining Ford's future.

Thus, keeping in mind the several opposing forces and unknown variables at play here, we suggest that investors hold off from taking any action regarding the Ford stock.



## 2 A brief history and introduction: An aging giant

Ford Motor Co. was founded by Henry Ford in 1903 in Michigan, United States. It pioneered the automobile industry in the 20th century by introducing the assembly-line which allowed automobile manufacturers to mass-produce vehicles to meet the increasing demand. It manufactures a wide array of vehicles including sedans, SUVs, trucks, and other off-road vehicles, commercial vehicles, etc. It also has a financing business that provides credit to various stakeholders in the value chain such as dealers and customers.

With a revenue of \$156 billion in 2019, Ford is the world's 4th largest automaker and the largest in the U.S. It was one of the most profitable companies in its first 100 years of existence but has been a shadow of its former self for almost 2 decades due to losing market share both in the U.S. and the rest of the world.

### 2.1 Business model

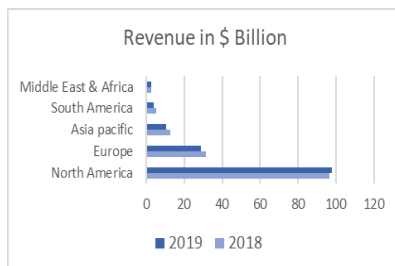


Figure 2: Ford's revenue by region.  
(Various sources, 2020)

Ford's most important market is the U.S.A., which accounted for almost 40% of its total global vehicles sales in 2019. The E.U. is the company's 2<sup>nd</sup> largest market, although it has been steadily losing steam there too. Its presence in emerging markets such as Asia and Latin America is a more complicated dynamic due to a more volatile macroeconomic landscape, but its performance there has also been taking a hit, arguably a larger one than that in the developed economies.

While Ford offers a wide variety of vehicles, its SUVs and trucks continue to be its breadwinner in the U.S, as is evident by its F-150 truck, which has been the bestselling passenger vehicle in the country for almost the past 4 decades and does not seem like it will be slowing down anytime soon. The good news is that such larger offerings have better margins than its other, more compact offerings. Ford also has a presence in the luxury vehicle segment in form of its premium brand 'Lincoln' but it only accounts for approximately 5% of the total revenues of the company as of 2019.

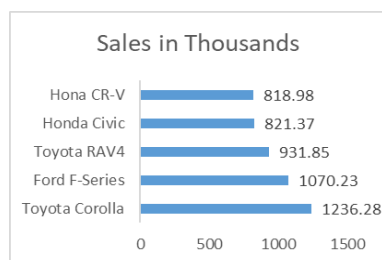


Figure 3: Bestselling vehicles in the U.S. (Various sources, 2020)

Ford has also built up a strong lending business in the form of Ford Credit on the back of its vast swathes of fixed assets to go hand-in-hand with its main automotive business. It provides financing to several members of its value chain, including distributors, dealers, and retail customers. It finances this operation by issuing asset-backed securities in the bond market. It has had a very positive impact on the firm's bottom line, as is evident from its performance these past 5 years where it has accounted for almost half of Ford's reported operating income, often persisting even when the automotive arm was stumbling. However, by its very nature, its long-term performance is bound to converge to that of the manufacturing arm since it does not originate sales, just facilitates them. After all, not many people would consider buying a car just because financing it will be cheap. For the most part, automotive purchases represent deeply personal, long-term commitments, and as such the product is still the main driver here. Thus, any short-term outperformance of the financing arm is unlikely to persist into the future.

## 2.2 A slow fall from grace: A continuous global decline

Most of Ford's decline over the past two decades can be attributed to a fall in its market share across the board, which in turn can be attributed to an aging line-up that lacks excitement and innovation, both in internal combustion engine (ICE) cars and electric vehicles (EVs) (both hybrid and battery-operated). The fall has been particularly pronounced in the emerging economies such as Asia and South America, especially due to regional players who specialize in catering to such markets. Its performance in Europe also continues to be lacklustre, in-part due to the sluggish macroeconomic landscape, as well as due to increasingly restrictive environmental regulations. Its non-commercial vehicles have suffered the most in the region.

This decline is best summarized by the following table which lists the difference between ROIC and WACC of its main competitors, which is one of the best measures of a firm's ability to create value for its stakeholders. The average difference between the 2 measures is -0.29%, which seems a bit low, but it is not unexpected given that it is one of the oldest, most mature sectors of the global economy with all the legacy players facing a raft of headwinds. Ford is no exception and seems to be one of the worst performers.

<i>Company</i>	<i>ROIC</i>	<i>Cost of capital</i>	<i>Difference</i>
Ford	4.27%	4.56%	-0.29%
GM	5.88%	3.36%	2.52%
FCA	7.84%	8.75%	-0.91%
Volkswagen	3.46%	2.72%	0.74%
Daimler	5.05%	2.63%	2.42%
Toyota	5.27%	1.77%	3.5%

Table 2: Value creation by Ford and its peers.

### 2.3 Going on a diet: The \$11B global restructuring

The company's previous management, which went out in October 2020, had shown a preference to counter this decline via a greater focus on improving efficiency rather than trying to tinker with its current offerings. To that end, it initiated a 5-year global restructuring in 2018 – that could cost up to \$11 billion – to try and mould itself into a leaner, more agile firm. Most of these efforts were concentrated outside the U.S.A, with the number of European manufacturing plants set to go from 24 to 18.

Globally, Ford planned to shed about 7000 jobs, with roughly a quarter of it being salaried positions and the bulk of the remaining cuts going to hourly workers. It also announced that it would phase out the slow-selling sedans and would move approximately 90% of the North American vehicle line-up volume to SUVs, trucks, and commercial vehicles.

It also announced plans to invest \$4B in its autonomous vehicle efforts through 2023, including a \$1B investment in Argo AI. Ford also reiterated its intentions to invest \$11B in electrification from 2015 to 2022 to deliver a total of 40 EV models globally. Its first major electric offering is Mach-E which was unveiled in the 2020H1, which boasted of a 300-mile range. Its other major upcoming unveil is an electric version of its best-selling F-series truck by mid-2022.

It recently unveiled an electric version of its popular commercial vehicle 'Transit'. However, reception to it was lukewarm at best given its disappointing range of 120 miles, which does not seem adequate given its target market. The company, however, maintains that it is sufficient for most of its use cases.

While the restructuring was received well by investors when it was first announced, it has since failed to produce much in the way of tangible results even after a little more than 2 years.

Moreover, the grinding pace at which the company was pushing reforms due to management's lack of impetus was also starting to irk investors, especially when other legacy automakers like GM were making a more concerted push towards electrification, as is evident by their 'Ultima' battery platform which they developed in-house and plan to use in their upcoming Hummer EV, an all-electric reincarnation of an iconic American off-roader.

## 2.4 New blood: CXO shake-up

The abovementioned concerns finally led to a change in the top management of the company as CEO Jim Hackett stepped down after being at the helm for a little more than 3 years and was replaced by Jim Farley, who had until then been Ford's COO. Farley's first action after coming in was replacing the CFO Tim Stone with John Lawler, who until then had served as Ford's CEO of Autonomous Vehicles and VP of mobility partnerships. He also made several other changes to Ford's senior ranks.

The new management is said to be more focused when it comes to revamping the line-up and pursuing electrification, as well as delivering the long-promised efficiency gains by cutting costs and reallocating resources more aggressively.

However, no major announcements have been made since the change took place and it remains to be seen if the new management chooses to roughly stay the course that their predecessors embarked upon or whether they would look to making sweeping changes. Initial comments to the media suggest that their priority seems to be a continued focus on the company's best sellers and to not stray from the course too much. But their reign is still in its infancy and thus there is a lot of uncertainty when thinking about Ford's future given that staying the course may not be the best choice given its underperformance until now.

### 3 The current situation: Weighed down by the past?

The current automobile industry stands at 62 million units sold down from 80 million in 2017. Which is approximately 22% decline in just two years. The industry seems to have reached a saturation point in its major markets, namely, the U.S.A., Europe, China, and Japan. Industry estimates suggest that the next growth spurt will likely be bought on by the introduction of more affordable electric vehicles in tandem with an aggressive push to set up the supporting infrastructure.

#### 3.1 Impact of COVID-19

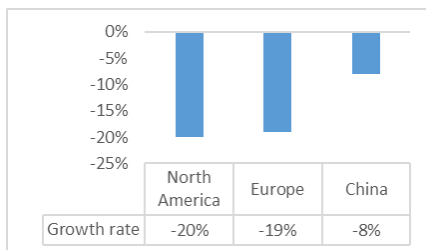


Figure 4: Impact of the Coronavirus on Ford's main markets. (Various sources, 2020)

The sudden outbreak of Coronavirus pandemic brought global mobility at a screeching halt with international flights being cancelled and majority of the population put various under various restrictions to arrest the spread of the disease. It was feared that the automobile industry would be hit especially hard and these fears were realized then sales contracted by almost 40% q-o-q in 2020Q2. However, this drop proved to be an outlier and not a precursor to a longer decline as most automotive manufacturers bounced back strongly in Q3, with Ford recording a ~94% increase in sales q-o-q.

However, we are not out of the woods yet as at the time of writing, most of the world is suffering from a 2<sup>nd</sup> wave of the virus, and in most cases, it has proven to be more devastating than the first one. However, the silver lining is that governments and the public are slightly better prepared this time. Still, several places have seen quarantines being reintroduced, especially in the E.U., therefore Q4 results are expected to be a mixed bag depending on how the pandemic shapes up as we move towards the new year. The biggest relief seems to be on the vaccine front as both Pfizer and Moderna reported very positive results on the ongoing clinical trials, raising hopes that long-term impact of the virus could be more forgiving than initially thought.

#### 3.2 The overcapacity conundrum

Automotive manufactures all over the world have been racking up the production capacity, Since the last 5 years the average capacity

utilization across the companies is around 75%. Most automotive producers expanded their production capacity as they forecasted a constant increase in demand specially in the developing economies like China and India. However, the industry growth continues to underperform expectations. This is a major concern as the plants have high fixed cost which can only be balanced out by effective capacity utilization. Keeping such dynamics in mind, other manufacturers such as GM, Volkswagen, Peugeot, etc. and have also decided to trim manufacturing capacity going forward.

The economic carnage wrought by the current pandemic could exacerbate the ongoing decline if the second wave continues to ravage through most major economies. The current situation would most likely force manufacturers to restructure their facilities to promote the increased demand for worker safety while simultaneously seeking flexibility so that production can be toned down if the slump persists and can also be ramped up reasonably quickly once the demand starts perking up again.

### 3.3 Competitive analysis

Ford was world's third largest automobile company by number of vehicles sold with a 5.59% global market share in 2019 only lagging Volkswagen and Toyota. Despite losing global market share consistently for more than a decade, it still maintains a firm grip on its main market, the U.S.A.

However, that too has been getting progressively more difficult with stiff competition from GM and Toyota in ICE and the hybrid market and Tesla in the EV market. Toyota recently announced a new R&D partnership with Panasonic dedicated to battery technology. GM recently unveiled its new battery platform 'Ultima' and has also committed to spending \$27 billion to launch 30 new EVs across the globe. Volkswagen and Renault have similar plans for the European market.

However, a positive indication for Ford is that it has been the 4<sup>th</sup> highest R&D spender in 2019 with R&D spent amounting to \$8.2 billion.

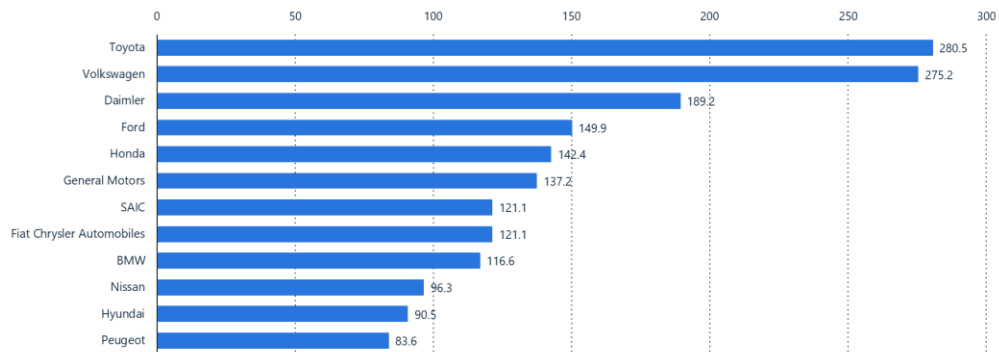


Figure 5: Leading global automakers in 2019 by revenue. (Various sources, 2020)

As stated earlier, Ford plans to shift 90% of North American line-up to SUVs, trucks and commercial vehicles since hatchbacks and sedans accounted for just 19.4% of the total sales in 2019. Rest 81.6% consists of trucks and SUVs. Ford's F-series continued its dominance as it was the bestselling pick-up truck in the U.S. in 2019, handily beating FCA's Ram by a significant margin of 262,892 units. The company also plans to launch a new, facelifted F-series in 2021 which should further consolidate its position in this segment assuming they are able to spec and price it competitively.

In Europe, its second largest market, Ford continues to rely on the popularity of its commercial vehicles while it slowly bleeds away passenger vehicle market share. The company is trying to push for electrification here as well, especially in its bestselling commercial models, but the new launches have not gone that well, and details about other long-term plays here are scarce. Our overall outlook here is neutral as the gains in one category continue to cancel out the losses in the other, with no clear winner in sight.

Ford also continues to struggle in developing markets like Asia as regional powerhouses like Suzuki, Hyundai, Toyota, Kia, etc. continue to claw away at its market share by undercutting its pricing and thus providing a better value proposition in such price-sensitive markets. Their dominance here is a natural result of their Asia-first legacy. A longer and better local track record leads to better feedback – both in terms of quantity and quality – over their foreign rivals, which in turn leads to better products and higher sales. It is a virtuous loop, aka 'the flywheel effect', the kind that Ford enjoys in its home ground, the U.S., with its massively popular trucks and SUVs.

## 4 The future: A long road ahead?

Ford's short-term future would revolve around the fate of its \$11B restructuring plan which in-turn will depending upon how well Ford can streamline their operations. Its long-term future will be determined by its ability to produce compelling offering in the EV segment and how well it is able to arrest its decline in its leading markets.

### 4.1 Is Ford running out of 'gas'?

#### 4.1.1 A look at Ford's current product mix

Due to the combination of an absence of any battery-electric vehicle and the lack of popularity of its hybrid line-up, Ford continues to rely on its legacy ICE offerings for almost all its automotive revenues. Digging a little deeper, we find out that most of it comes from the large passenger vehicle segment, which consists of pick-up trucks and SUVs. Light vehicles, which includes sedans, hatchbacks, etc., account for only a small portion of the pie.

	U.S. Retail Sales		U.S. Wholesales	
	2018	2019	2018	2019
Trucks	1,139,079	1,243,136	1,156,022	1,285,859
SUVs	872,215	830,471	937,845	816,933
Cars	486,024	349,091	445,999	309,413
Total Vehicles	2,497,318	2,422,698	2,539,866	2,412,205

Table 3: Ford's sales by vehicle type.

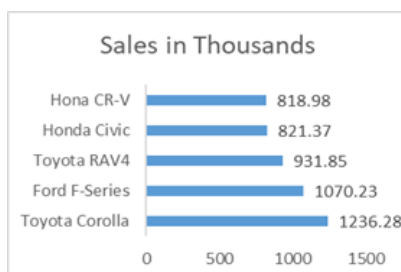


Figure 6: Bestselling passenger vehicles in the U.S. (Various sources, 2020)

As we can see, in 2019, Ford's massive truck sales, which accounted for 53.31% of its U.S. wholesales, can be attributed to the continued dominance of its F-150 model, which has been the bestselling passenger vehicle in U.S.A. on and off for almost the last four decades. SUVs were second in line with a wholesale share of 33.87%, with smaller cars accounting for a measly 12.82%.

The continued popularity of the SUVs and pick-up trucks in both its major markets, but especially in the U.S.A. has ensured that despite the ever-increasing competition and a lack of compelling electric and hybrid options, Ford continues to pump out reasonably good sales figures year over year.



In the following section, we will look at the SUV market in Ford's biggest target geographies. A similar analysis of pick-up trucks, which account for a larger share of Ford's revenues, would be much less useful given that they are a predominantly American phenomenon and the F-150's sales are projected to largely follow its historical trend given the continuous appetite displayed for it by its consumer base.

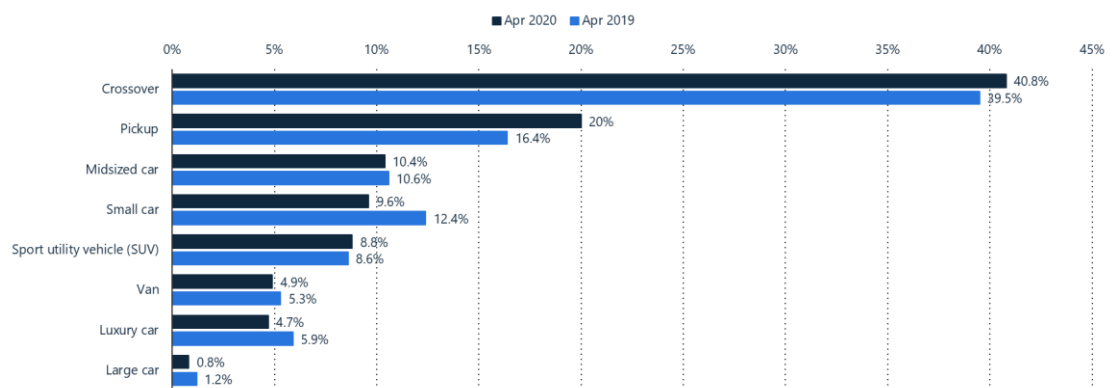


Figure 7: U.S. light vehicle sales by segment. (Various sources, 2020)

The persistence of this dynamic is best captured by the above infographic, which shows the demand in the U.S. light vehicles market by segment between April 2019 and April 2020. The two things that jump out when we look at it are:

- It shows us that pick-up trucks were the second most popular segment.
- While most other segments saw a contraction, the demand for pick-up trucks grew from 16.4% to 20%, which is an annual growth of almost 22%. For comparison, crossovers, which is the largest segment, grew from 39.5% to 40.8%, which is a growth of just 3.29% over the year.

The 2020Q3 results reinforce this notion as pick-up truck sales growth somehow managed to stay positive despite an unprecedented macroeconomic shock. The contraction in all other segments is much more in line with expectation. The fall is precipitous in the smaller cars segment, which also lends credibility to Ford's decision to move most of its North American volumes to its larger offerings.

Q3 2020 SALES				
	Total Vehicle	Truck	SUV	Car
<b>Total U.S. Sales</b>	<b>551,796</b>	<b>311,751</b>	<b>191,803</b>	<b>48,424</b>
Total Sales vs. Q3 2019	-4.9%	0.6%	-0.7%	-37.5%
Retail Sales vs. Q3 2019	-2.0%	8.3%	-3.4%	-31.3%

Table 4: Ford's Q3 2020 sales in U.S. by segment.

Thus, it would not be unreasonable to assume that this segment will continue to perform well for Ford, especially with the recent launch of the facelifted F-150 and its upcoming hybrid and battery-electric versions which are set to go on sale by the second half of 2022.

#### 4.1.2 The SUV market

The robust demand for SUVs is personified by the following infographic which compares the share of SUVs in new vehicle sales amongst the three largest automotive markets in the world, the U.S.A, the E.U. and China.

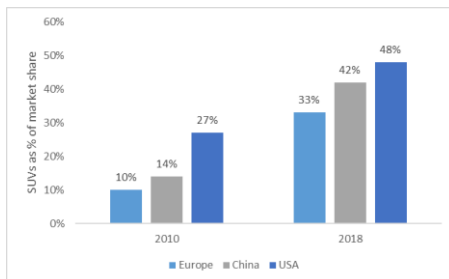


Figure 8: SUVs as % of total new vehicles sales. (Various sources, 2020)

Figure 7 implies that SUV's share in new vehicles grew at a CAGR of 7.46% in the U.S., 14.72% in Europe and 16.10% in China, all of which are leaps and bounds ahead of the 1.5% to 2.5% historical annual growth of the global automotive market.

To try and provide greater context to these growth rates, the following graph details the light vehicle sales worldwide between January and June of 2019 by segment.

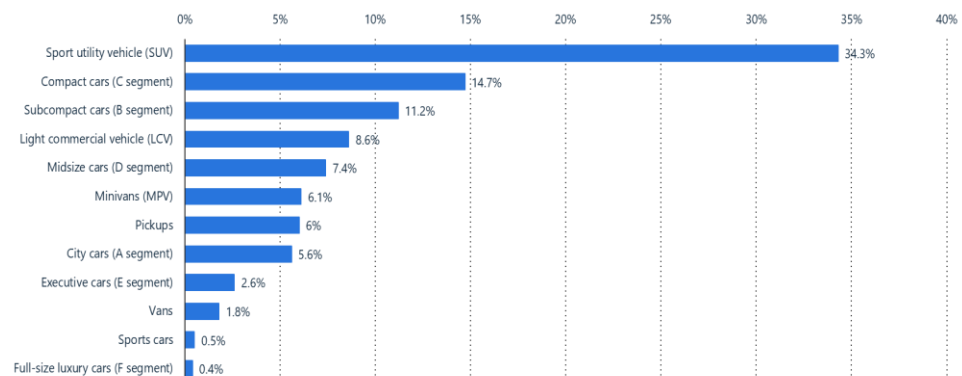


Figure 9: Worldwide light vehicle sales by segment. (Various sources, 2020)

As we can see, 1 in every 3 cars sold worldwide in those six months was an SUV, and it does not seem like the trend is going away soon, with sales worldwide projected to go from 26.7M in 2017 to 51M in 2023, a CAGR of 11.39%. However, these estimates were made in the pre-pandemic era, and the realized growth over the next 5-6 years will most likely be lower than them. The magnitude of difference is extremely difficult to forecast given the sheer number of independent variables at play, but even the most conservative measures would still portray that this segment's growth will easily outpace that of the larger market, even in case of an overall contraction.

Despite Ford's prowess in this uber popular segment, we must keep in mind the highly skewed nature of its revenues, with almost three quarters of it coming from the U.S. Thus, if we take a step back and assess the aggregate SUV sales in all major geographies, we will see that Ford still lags the likes of Toyota, Nissan, Honda, etc. by a significant margin. The following figure segments the global SUV sales data (in thousands) for 2018 by major brands.

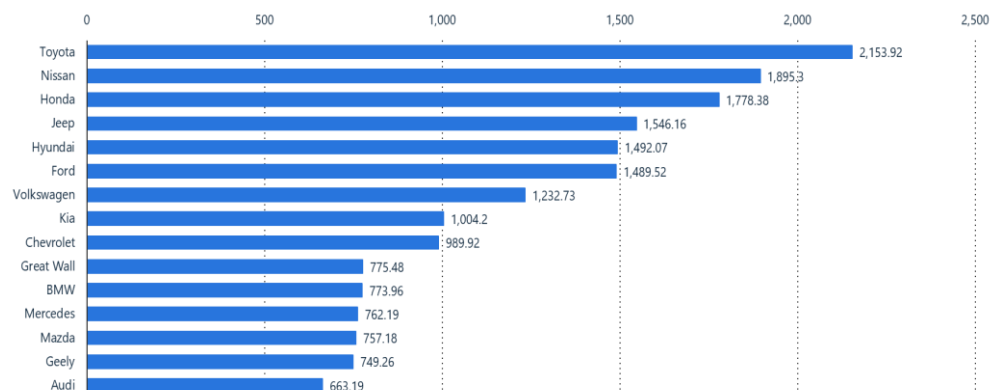


Figure 10: Global SUV sales by company (in thousands). (Various sources, 2020)

As we can see, Toyota sold almost 45% more SUVs globally than Ford, and most of this outperformance can be attributed to its larger scale and a relatively more egalitarian split of sales across different geographies. The extent of Ford's geographic skew is made clearer when we consider the fact that none of its SUVs made it into the global 10 bestsellers list in 2019.

#### 4.1.3 Implications for key value drivers

From an investor's point of view, given the high geographical skew of Ford's sales, its performance in the North America and the Europe will determine its fate going forward.

Its position in the North American market is quite unique. While its failure to pursue electrification more aggressively should have a bigger impact on its sales numbers going forward, at least when viewed in isolation, the fact that its current ICE-based bestsellers align so well with the existing consumer psychology in its main market (U.S., with ~70% revenues) means that the overall impact of their inaction elsewhere is mitigated to a large extent.

However, given the company's sales figures over the past 5 years, the trend overall has still been a consistent erosion of market share with an average annual loss of ~1.45% in the U.S.

Despite this bleed, Ford's North American revenues have still been creeping up with a 5y CAGR of 1.30%. The two main reasons for this disparity are: -

- First, larger vehicles tend to command higher prices and are more profitable than smaller vehicles, both across and within vehicle segments. Specifically, in North America, the company's larger, more profitable vehicles had an average contribution margin that was about 130% of its total average contribution margin across all vehicles, whereas its smaller vehicles had significantly lower contribution margins.
- Second, despite an overall decline in business due to a mix of product and market headwinds, the company continues to gain efficiency in its manufacturing process, as is evident by its revenue per vehicle growing by a 5y CAGR of ~4.40%.

Given the prevailing market conditions, including both the product and geographic mix, we predict that Ford will continue to lose market share in North America, albeit at a lower rate for ~1.20%, at least until 2024, which is an improvement of almost 20% over the current rate.

North America	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Market growth		-1.05%	-1.72%	2.09%	-3.87%	-17.00%	19.00%	0.75%	1.00%	1.25%	1.25%	1.25%
Market share	14.00%	13.90%	13.90%	13.40%	13.20%	13.04%	12.89%	12.73%	12.58%	12.43%	12.30%	12.17%
% growth		-0.71%	0.00%	-3.60%	-1.49%	-1.20%	-1.20%	-1.20%	-1.20%	-1.20%	-1.05%	-1.05%

Table 5: Ford's North America market share and growth.

Our rationale behind this improvement is that its current offerings will enjoy a slight boost in popularity over this period owing to the interest rate and oil price tailwinds, which should make purchasing and operating new vehicles slightly cheaper for the end user.

The loss of market share should slow down further to ~1.05% after 2024, which is a further improvement of almost 15%, as the electric and hybrid versions of its popular trucks and SUV's become more commonplace.

The reason we forecast an overall decline despite such developments is our view that Ford's main competitors such as GM, Toyota, etc. are making faster progress on this front and other promising ventures such as Rivian have also had a head-start in making large, plug-in electric vehicles.

Thus, Ford's ICE sales in North America will continue to be the driving force for the company for the short- to medium-term despite any developments in the rest of the company's markets.

We avoided forecasting things beyond 2026 since we do not think a reasonable estimate can be made of the industry dynamics by that point. A lot is happening across the cross section of legacy and new automakers and it is very difficult to foresee major technological developments that will drive the industry in the long-term.

In our forecast, the company would reach a relatively stable state by 2026. By then, it would have consolidated its line-up towards its bestselling vehicles, the majority of which would still be ICE-powered. This trend will likely persist until at least the end of the decade, i.e., until 2030, and may even survive past that. But given the current pace of technological and regulatory changes, we did not forecast things that far.

The company's future in Europe would likely follow a similar path, although its dominance here is mainly in commercial vehicles like the 'Transit', which makes forecasts a bit more difficult given the logistical preferences of businesses are not as sticky or easy to gauge.

Q3 2020 SALES						
	Total Vehicle Sales	Total Vehicle Market Share	Passenger Vehicle Sales	Passenger Vehicle Market Share	Commercial Vehicle Sales	Commercial Vehicle Market Share
Euro 20*	299,632	7.6%	205,067	6.2%	94,565	15.1%
Versus Q3 2019	-4.2%	+0.1 ppt	-7.5%	-0.1 ppt	+3.8%	+0.5 ppt

Table 6: Ford's Q3 2020 sales in Europe by segment.

The above results paint a mixed picture as gains in commercial vehicles are wiped by the losses in passenger vehicle sales. The lukewarm response to the recent launch of 'E-Transit' also casts a shadow on the demand of Ford's commercial vehicles on the continent. However, it is important to keep in mind that it is just the first generation of the vehicle, and future iterations would likely boast of better capabilities.

The bad news here is that the E.U. does not have nearly the same volume of demand for any of the company's passenger vehicles, so the balancing effect that future launches in this segment will provide will also likely be minimal.

Europe	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Market growth		0.59%	5.54%	0.94%	-2.06%	-19.00%	17.50%	0.25%	0.35%	0.45%	0.50%	0.50%
Market share	7.70%	7.70%	7.50%	7.20%	6.80%	6.61%	6.43%	6.25%	6.08%	5.92%	5.76%	5.62%
% growth		0.00%	-2.60%	-4.00%	-5.56%	-2.75%	-2.75%	-2.75%	-2.75%	-2.75%	-2.55%	-2.55%

Table 7: Ford's European market share and growth.

The above dynamics, combined with the fact that Ford has been losing market share in Europe at an average of 3% annually over the past 5 years, leads us to believe that the firm will see a marginally lower market share bleed of 2.75% till 2024, a ~8.5% improvement over its current conditions.

We foresee it falling further to ~2.55% by 2026 given the expectation of iterative improvements in the commercial vehicles segment and a further consolidation in the passenger vehicles segment. It is also likely that ICE commercial vehicles will play a larger role for Ford in the EU than in North America, despite stricter regulations, due to much lower demand of its largest passenger vehicles.

## 4.2 EVs: Looking for a 'charger'.

We had mentioned earlier in the report how EVs are poised to be the biggest growth driver of the automobile industry and are set to largely replace ICE vehicles within in the next 10-20 years.

The segment is still in its nascent phase but just like every other industry a head start in R&D and innovation in the early stages gives an edge to the companies and they reap the ensuing competitive advantage for several years. Ford has been torpid in its EV approach. It only recently launched its first plug-in EV (the Mach-E) and has just 4 hybrid vehicles

in its lineup, all of which failed to compete with the likes of Tesla in the U.S., BYD in China and Toyota, BMW, Renault in Europe.

Ford's hybrid EV sales only constitute 0.38% of the total vehicles sold globally in 2019. It has the worst EV to total vehicles sold ratio among the 10 biggest automobile companies in this world.

Ford's and other U.S. automaker's lethargic approach towards EVs allowed Tesla to gain a market share of 81.6% in the segment as of 2019. It would be extremely difficult for Ford to claw back a piece from Tesla's pie as it is years behind it in terms of technology.

Ford's focus on its ICE segment will probably be good for the company's bottom line in the short- to medium-term, but the high opportunity cost is bound to catch up to them in the long-term in the form of lower future EV sales. EVs are expected to account for 10% of global automobile sales by 2026. According to our estimates, Ford has planned to launch roughly 40 EVs globally over the next 5-10 years, including an ecosystem of electric commercial vehicles. However, only 3 have been confirmed so far. Thus, taking the current pace of development into account, we have estimated that it will sell around 200,000 EVs globally by 2026, which would account for just ~4.5% of its sales by volume. This is quite low compared to the projected industry average of 10%.

Ford's projections being on the lower end of the spectrum for 2026 imply that they are underprepared and will likely continue to trail the larger plug-in market even until the end of decade, 2030, when EVs are expected to make up almost 28% of the global automotive sales.

Ford's new CEO, Jim Farley, has admitted that Ford is still taking baby steps in the EV market, but has committed that market should expect a quick turnaround from the company given its historic R&D and financial prowess.

He also helmed the launch of Ford's first ever plug-in SUV, the Mustang Mach-E, which was announced under his predecessor, but saw a renewed focus under current management. It is set to compete against the likes of Tesla Model Y, Audi E-Tron, Volvo Polestar 2, etc.

The good news here is that despite the being late to the game, Ford hasn't come empty handed as Mach-E looks to be competitively specced and priced with a 300-mile range for its mid-tier, \$50,000 model. This pits it directly against the segment leader, Tesla's Model Y, which boasts of a 325-mile range at an identical price. Given the competition's slightly better range, superior technology and much more favorable brand perception, Ford will have to really go all out on the Mach-E's marketing

efforts to start clawing back a reasonable share of the market. It's success with this platform will give investors important clues regarding the company's future in this critical segment.

#### 4.2.1 Forecasting Mustang Mach-E's sales

The Mach-E deliveries are poised to start around the New Year's Eve. Ford expects to produce 50,000 units in 2021 with an average retail price of ~\$50,000. The initial reaction to the launch has largely been positive with both journalists and prospective customers praising Ford's design choices and pricing.

According to the pre-booking data, Ford has already received 41,000 reservations. They expect the remaining units to be booked soon, probably by the end of 2021Q2. Historically, 70% people who make a reservation end up buying the car. However, given the positive reception, Ford has little worries about selling all its units.

<i>Vehicles sold</i>	<i>Average price</i>	<i>Revenue (\$ million)</i>
50,000	50,000	2500

Table 8: Mach-E's expected sales for 2021.

The forecasted revenue for this vehicle is \$2500M for 2021, which would be 2.1% of their total annual sales. However, the catch here is that Ford is likely to make a loss on this model due to higher fixed costs and minimal economies of scale associated with transitioning to a completely new platform, drivetrain, and manufacturing process. Moreover, the selling, general and administrative expenses would also be also slightly higher due to the required retraining of factory floor workers. Keeping all this in mind, the operating margin on this launch will initially be a measly 1.50% to 2.00%.

Another important point is that due to rapid technological changes, the operating margins on EVs is nowhere near steady state and will remain quite unpredictable for quite some time. Ford expects the current pace of development to lead to a 10% to 20% reduction in prices of Mach-E over the next couple of years with the fierce competition in the segment consistently challenging margin expansion.



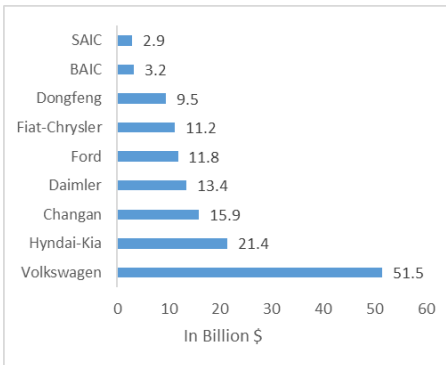


Figure 11: Biggest investment in EVs by manufacturers. (Various sources, 2020)

Keeping in mind all these dynamics at play here, it is our view that the Mach-E's sales will not have any material impact on Ford's bottom line for the foreseeable future. For the EVs to start making a dent, Ford will have to scale up its current offerings a lot, and fast. The sooner it does this, the sooner it can start benefitting from the improving economies of scale. Nonetheless, this is still a promising start as 50,000 units is a reasonably good industry figure for a first foray into plug-in vehicles.

Ford's priority now should be a comprehensive follow up after its promising debut by aggressively pursuing R&D in the field, especially in battery technology as that is one of the biggest hurdles to mass adoption of the platform. Launching a few more EVs would just not cut it. Other than the traditional OEMs, it is competing against cutting edge startups like Nio, Rivian, Xiangpeng, Faraday, etc., and lot of them are backed by large VCs with deep pockets and are laser-focused on this platform and its intricacies.

There is a possibility that Ford could explore acquiring any such promising EV startup since it could be a good way to make up for its sluggish pace until now. In such a case, the valuation metrics for Ford's EV portfolio could be quite different from their current state. However, given the bubble-like craze in the EV-related SPAC market right now, Ford will likely have to pay through its nose for any such acquisition, which likely means little to no value-add, if at all, in the long-term.

Moreover, it already bought a minor stake in Rivian for \$500 million and apparently has planned to use its technology for its luxury brand, Lincoln, to launch an EV by 2021. But that project has been put on the hold this year and the vehicle would not be launched until at least 2023. Other details about this partnership remain scarce and its ultimate contribution to Ford's bottom line remains to be seen. Thus, our assumption here is that no major acquisitions will be made, and all of Ford's EV-related R&D will continue to be done in-house.

#### 4.2.2 Impact on valuation

All in all, while the Mach-E looks promising, the overall future of the company in this segment is still quite uncertain. While Ford is quick to push out statements to shareholders regarding its plans about EVs, those statements are seldom followed by timely, orderly action. This is the reason why we chose to segment our revenue forecast by geography instead of drivetrain. However, our growth rates still implicitly account for our view of Ford's future in the EV segment in each of its major

geographical market. EVs will play the biggest role in North America, then in Europe, and then finally in China. Their impact in Ford's other market will likely be immaterial in the long-run due to their economic make-up and their miniscule contribution to Ford's current sales.

Our approach would have been different if Ford had a concrete roadmap for EVs which it faithfully followed and thus had some positive results to show for itself. In that case, EVs would have a higher % in the total sales and maybe its long-term growth rate would have been above the industry average.

## 5 Valuation

Our core thesis with Ford is that the status quo will persist going forward as the company's demonstrated lack of urgency – whether it involves shedding excess fat or aggressively pursuing new growth avenues – is balanced out by the continued popularity of its bestsellers, specifically its SUVs, trucks, and commercial vehicles.

The infancy of the new management throws a wrench in our work as there is a marked lack of official communication regarding their long-term plans for the company. The earliest anyone can expect such information to be made public in any appreciable detail is in the next annual shareholder's report, which should shed further light on the fate of the \$11B restructuring initiated by their predecessors as well as any new ideas they might have of their own. Their comments to the media up until the writing of this report have been generic with no major change of course and/or policy communicated yet.

However, our job as analysts and potential investors is to make-do the best, we can with what we are given.

Thus, while it would be ill-advised to read too much into what the new management says or does since it is still very early days, any reasonable investment analysis will still have to err on the side of caution by maintaining a margin of safety in the forecasts, as the first rule of investing is to avoid losing money. We have attempted to do that by assuming that the overall condition of the company will see minimal change going forward, which means that the current market dynamics will continue to work against the company ethos and their pace of adaptation will be mediocre at best.

This view is given further credence by a couple of factors, the first of which is that the company has announced just 3 EVs that are scheduled to come out by 2022, which is a tiny fraction of their initial target of 40 new models that they set up in 2015. The lack of promising new initiatives as well as follow-up on previous announcements does not bode well for the future. The second factor, and this may be a bit more controversial, is the lack of urgency communicated by the new management, instead preferring to regurgitate what their predecessors had claimed. The asterisk here is that it is still extremely early to make such claims, but our view is that any management brought in to arrest a declining business must be more aggressive with their communication and actions than people would generally expect.

If things were not that bad, they would not have been brought in in the first place, and thus we feel it is important to own up to the firm's past shortcomings more readily and publicly, which the new management has thus far failed to do.

## 5.1 Forecasting the income statement

### 5.1.1 *Revenues*

At the time of writing this report, Ford is delicately balanced between two opposing, secular trends. The first is the urgent need to push for greater electrification of the line-up, which the firm has so far failed to do, and the other is the consistent demand for its large form factor passenger vehicles such as SUVs and trucks worldwide, which Ford is a market leader in. Thus, while the long-term performance of the company is likely to suffer from a lack of EV offerings if they do not change course or at least shift gears, its short- and medium-term future seem relatively safe given the continuous demand for its bestsellers, the electric versions of which have already been announced and are scheduled to roll-out within the next 1-2 years, which should provide some long-term support to top-line growth.

While the above may be a more bottom-up approach towards predicting aggregate demand, even the top-down approach seems finely poised between two opposing macroeconomic forces. The first is the economic damage wrought by the ongoing pandemic, which seems likely to continue until a vaccine reaches enough penetration to spur herd immunity, which could take anywhere from 6 months to 18 months. Counteracting this record demand-side shock is also a record supply-

side policy response in the form of an extremely low interest rate environment in most major economies, as well as a first of its kind direct stimulus payment to citizens in countries like U.S. and Germany, etc. This has given a boost to aggregate savings across the economy, which means that the pent-up demand could turn out to be significant when things do start opening back up. Oil prices have also taken a significant hit, which means that not only is it easier to finance a new purchase, but it will also be cheaper to operate it going forward.

Keeping everything in mind, we decided to combine both the abovementioned approaches when forecasting Ford's revenues. The top-down view is accommodated using 2 independent variables: total market size and Ford's market share. The bottom-up view is considered by including Ford's revenue per vehicle, which helps us in capturing the company's evolving product mix and its impact of their revenue profile across all its geographical markets, namely North America, Europe, China, South America, Asia Pacific and Middle East & Africa.

The value drivers work as stated below: -

Revenue = Vehicles sold \* revenue per vehicle (RPV)

Where, vehicles sold = Total market size \* market share.

<i>North America</i>													
Year	2015	2016	2017	2018	2019	2020	2021	2022E	2023E	2024E	2025E	2026E	
Vehicles Sold (in thousands)	3073	3019	2967	2920	2765	2267	2666	2654	2648	2649	2654	2659	
% growth	-	-1.05%	-1.72%	2.09%	-3.87%	-17.00%	19.00%	0.75%	1.00%	1.25%	1.25%	1.25%	
Total market size (in thousands)	21950	21719	21345	21791	20947	17386	20689	20844	21053	21316	21583	21852	
Market share	14%	13.90%	13.90%	13.40%	13.20%	13.04%	12.89%	12.73%	12.58%	12.43%	12.30%	12.17%	
Revenue per vehicle	29905.63	30672.41	31506.91	33088.01	35462.21	36526.07	37621.85	38750.51	39913.03	41110.42	42343.73	43614.04	
% growth	-	2.56%	2.72%	5.02%	7.18%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	
Revenue (\$ million)	91900	92600	93481	96617	98053	82820	100294	102829	105689	108898	112374	115962	

Table 9: Forecasting Ford's North American revenues till 2026.

Since Ford currently derives more than 90% of its revenues from North America (~70%) and Europe (~20%), we decided to concentrate on these two regions.

We forecast that Ford will continue to shed market share in all geographies, but the rate at which it will occur would be slower than the preceding 5 years (-1.14% vs. -1.50% in North America and -2.67% vs -3.53% in Europe). This will be due to the respectable sales of its trucks and SUVs in the former and of its commercial vehicles in the latter, and in part due to the much-anticipated launches of the Ford Bronco, Mustang Mach-E and the electric F-150 in 2022, all of which cater to the same, wildly popular segment. The decline in market share tapers off towards the end of the forecast in all its geographical markets (-

1.05% vs -1.20% for North America and -2.55% vs. -2.75% for Europe) as the company will be able to introduce new EVs by 2026. Although these launches will be mostly behind schedule, they should nonetheless offer customers a compelling choice going forward, especially if the Mach-E's 300-mile range is anything to go by.

Additionally, incremental retooling of several existing facilities means that the company will be increasingly able to harvest economies of scale going forward, which should ensure competitive pricing in most of its electric offerings. This is accounted for through an increase in revenue per vehicle over time in most of its geographical markets (3.00% for North America and 1.50% for Europe, which have both been kept slightly below their historical averages to maintain a margin of safety in the forecasts). These rates have also implicit in them our low expected inflation in both the regions.

In China, we expect Ford's total market share to contract by almost 50% in 6 years, from 1.96% in 2020 to 0.94% in 2026. This can mainly be attributed to its fierce competition with well-funded regional players such as Nio, Xpeng, etc., which in-turn may partially stem from the questionable intellectual property practices of the region. The higher growth, at 4.5%, reflects an elevated exchange rate and tariff-related risks.

Ford is also cutting back its business in South America. This is reflected by an annual loss of market share of ~6% and a 3.2% contraction in RPV until 2026.

Asia Pacific also presents a similar story with Ford struggling against strong regional players. We expect its market share to go down from 1.36% in 2021 to 0.82% in 2026, with a relatively higher RPV growth of 6.50% keeping in mind the larger vehicles on offer as well as higher expected inflation in the region.

Lastly, Middle East and Africa, which accounts for ~1% of Ford's sales, will see an average annual market share loss of 6.55% and an annual RPV growth of 2.25%.

### 5.1.2 Costs

Given our assumption that the current market dynamics will largely persist going forward, we expect minimal change in most of Ford's cost structure going forward.

The biggest change here is a roughly 15% decline in sales, general & administrative (SG&A) costs over 5 years, from 7.75% in 2021 to 6.75% of total Automotive and Mobility (A&M) revenue in 2026. This can be attributed to Ford's planned white collar layoffs as well as its plans to reduce its number of manufacturing facilities in Europe from 24 to 18.

The cost of goods sold will also see a marginal reduction from the long-term average of 90.70% to 89.50% as shedding excess capacity would lead to marginally more cost-effective utilization of current resources, including both labor and equipment.

These effects may seem suppressed to the reader given the magnitude of change that Ford is trying to implement. However, it is important to keep in mind that it is not just a simple contraction of the asset and labor bases. It will also involve investments into retooling the remaining manufacturing facilities as well as retraining a noticeable portion of the assembly line workforce to cater to the increasing EV volumes.

We do not foresee any major changes to the cost structure of Ford Credit since it is a relatively well-oiled machine and thus it would not make sense to try to change things too much.

## 5.2 Balance sheet trends

We forecast minimal overall change in the balance sheet structure, with most ratios remaining roughly equivalent to their 5-year trailing averages, including both working capital and long-term assets and liabilities. However, as expected, Ford's fixed assets are set to see a slight decline due to its ongoing attempts to reorganize its supply chain in Europe.

### 5.2.1 Property, plant, and equipment (PP&E)

We forecast that Ford's PP&E will go down 7% from its long-term average of 23.63% of its revenue to 22% over the next 5 years due to disposing off 6 – or 25% – of its manufacturing facilities in Europe under its current restructuring plan.

As stated earlier, the figure could have fallen further if the cuts were done in isolation, but the need for reallocating resources towards producing electric vehicles puts an opposing, expansionary pressure on its manufacturing asset base.

### 5.3 Capital structure

We do not foresee Ford making any meaningful additions to its debt burden within the forecast period due to already having plenty of liquidity – worth more than \$25B – at hand. It should be sufficient for all its current as well as planned operational, investing and financing needs.

The significant pre-existing debt burden and the surrounding macroeconomic uncertainty will most likely weigh heavily on the management's mind if and when they think about making material, additional borrowings.

Also, given the longevity of the business and the subsequent investor expectations that have been shaped by it over decades, we also forecast the payout ratio to stay as it is, which currently stands at a relatively consistent 66%. The strong signaling effect that entails from any reduction in dividends gives us confidence in our forecast.

Thus, we can say that Ford's maturity lends itself to a relatively stable capital structure despite any operational transformation that the business may be trying to accomplish internally.

#### 5.3.1 *Weighted average cost of capital (WACC)*

We first used the Capital Assets Pricing Model (CAPM) to obtain Ford's cost of equity.

We used two methods to calculate Ford's levered beta, the first was by regressing Ford's stock returns with the S&P 500's return for the past decade. A weekly frequency was chosen for the data points as our research showed that it produced the cleanest regression by avoiding the noise associated with daily data while also avoiding the loss of information incurred by choosing longer return frequencies. This gave us a beta of 1.315.

The second method we used was computing Ford's beta through comparable companies. This was done to triangulate the results of the regression by gaining an alternative perspective on the stock and the underlying asset's market risk. The companies included in the analyses were General Motors, Fiat-Chrysler Automobiles, Volkswagen, Daimler and Toyota, all mature, global auto manufacturers. The analysis yielded a beta of 2.16.

The difference in both the estimates is quite significant. After further researching this anomaly, we hypothesize that the ongoing crises affects the comparable firm analysis much more than it does the regression. This in turn can be attributed to the former's reliance on current market values of equity and debt and the latter's longer window (10 years) of analysis. Therefore, it is our view that the regression beta is a more accurate portrayal of Ford's long-term undiversifiable risk, and thus that is the one we have used in our analysis.

The equity risk premium (ERP) was taken from Professor Damodaran's website (Damodaran, Country Default Spreads and Risk Premiums, 2020), which is a highly respected source used widely by academics and practitioners alike. He computes it by first obtaining a country's default spread through a mixture of its sovereign credit rating and CDS spread over the U.S., which is then multiplied by the ratio of volatility of the country's equity and bond indices to get a country risk premium, which is finally added to the mature market risk premium, which corresponds to the implied premium for the S&P500 of 5.23% (as of July 2020).

$$\text{ERP} = \text{mature market risk premium} + \text{country risk premium}$$

Since Ford is a U.S. based enterprise, the country risk premium = 0, hence,  $\text{ERP} = \text{mature market risk premium} + 0 = 5.23\%$ .

Using the 10-year U.S. Treasury bonds rate of 0.867% as the risk-free rate, we get a cost of equity of 7.75%.

For calculating Ford's cost of debt, we referred to the current yield to maturity (YTM) of its 10-year bonds, which is ~4.85% (via Bloomberg Terminal), as well its annualized default rate (ADR) of 0.65% and loss-given-default (LGD) of 30% associated with its credit rating of BB+ (via S&P), which is just one notch below investment-grade. Both figures were taken from (Kraemer, 2020).

$$\text{Cost of debt} = \text{YTM} - (\text{ADR} * \text{LGD})$$

This gave us a cost of debt of 4.65%. Finally, using Ford's debt-to-equity ratio of 3.47 gave us a WACC of 5.34%.

## 5.4 DCF valuation

Using the aforementioned figure yields a final share price of \$9.32 (basic) and \$9.25 (diluted) as of end of FY 2021, which is 5.19% higher than Ford's current share price of \$8.86.



DCF valuation		For the years ended December 31,				
(\$ million)		2022	2023	2024	2025	2026
Free cash flow		(9414)	8664	9310	7436	6584
Discount factor		0.95	0.90	0.86	0.81	0.77
PV of FCF		(8937)	7809	7966	6040	5078
Continuing value						208169
PV of continuing value	160540					
Operating value	178496					
Add: Excess cash	31533					
Add: Investments	2519					
Enterprise value	212548					
Less: Debt	(156435)					
Less: Post-retirement obligations	(19096)					
Value of equity	37017					
Price per share, basic (\$)	9.32					
Price per share, diluted (\$)	9.25					

Table 10: DCF valuation for Ford Motor Co. as of end of FY2021.

Where the perpetual growth rate,  $g = \text{ROIC}_{t-1} \cdot \text{RR} = 5.89\% \cdot 35.73\% = 2.10\%$  (all figures as of 2026), which is well within the global automotive industry's long-term annualized growth rate of 1.5% to 2.5%.

#### 5.4.1 Sensitivity analysis

Our sensitivity analysis was done considering asymmetric scenarios. Instead of considering the possible upside and downside to be equal in magnitude, our range of expectations spanned from a 75% downside to a 25% upside to the forecasted perpetual growth rate of 2.10%. This unconventional approach was taken keeping in mind the fragility of Ford's current situation vis-à-vis the ongoing business transformation amidst major industrial headwinds and an extremely uncertain macroeconomic backdrop.

Price per share (\$)	(4.37)	1.13	9.32	13.02	17.43
RR/ROIC	1.47%	3.68%	5.89%	6.63%	7.36%
8.93%	0.13%	0.33%	0.53%	0.59%	0.66%
22.33%	0.33%	0.82%	1.32%	1.48%	1.64%
35.73%	0.53%	1.32%	2.10%	2.37%	2.63%
40.19%	0.59%	1.48%	2.37%	2.66%	2.96%
44.66%	0.66%	1.64%	2.63%	2.96%	3.29%

Table 11: Analysis of our DCF valuation's sensitivity to the perpetual growth rate,  $g$ .

As expected, the broader-than-expected range of inputs results in a broader-than-expected range of outputs. The most striking result of this analysis is the fact that even though all growth rates in the table are positive, the company is only better off than the base case in a small fraction of the scenarios. A 37.5% reduction in perpetual growth, which would still be a respectable 1.32%, will push the value of Ford's equity towards 0. This highlights the risk that the asset-heavy behemoth faces in creating value for shareholders in the future. They need to innovate, and they need to do it fast. Otherwise, the slow, downward trajectory that the firm has been on for the past decade will eventually pose a credible threat to its solvency.

The good news is that the overall results are still positively skewed as only a 12.5% increase in the perpetual growth rate to 2.37% is enough to unlock the way towards a ~40% upside with a price per share of \$12.82.

## 5.5 The Black-Scholes model: Valuing equity as an option

Given the unique combination of a business facing major industrial headwinds, a generational economic shock and the high level of financial leverage involved, we thought it would be interesting to value Ford's equity as a derivative, specifically a call option, using the Black-Scholes model.

This method is useful when analyzing firms that are struggling and are in a distress or near-distress state (Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset*, 2012). The reasoning is that the underlying asset in this case is the enterprise value of the firm computed using a DCF and the strike price is the face value of the firm's outstanding debt. A distress/near-distress state means that the value of the asset (in this case, Ford Motor Co.) is not too far from the strike price (Ford's total financial obligations), and therefore the equity can be reasonably valued as a call. It is crucial that both these numbers are reasonably close to each other. This is not the case when the firm in question is well run and their enterprise value far outweighs their total debt burden. In such cases, the total value of the underlying assets is too far away from the strike price for the model to be of any practical use as it would be equivalent to calculating the value of an absurdly far-OTM option.

The duration of the call in this case was the face value weighted average duration of Ford's outstanding bond issues, and the variance of the underlying asset was taken from (Damodaran, Standard Deviations by Sector (U.S.), 2020).

Years to maturity	1	2	3	4	5	10 or more	Total
Face value of debt	53964	32163	23727	10681	10636	24136	155307
Discount factor @ r	0.9984	0.9968	0.9952	0.9936	0.9920	0.9841	
Face value/Total	0.35	0.21	0.15	0.07	0.07	0.16	
Weighted average duration of debt	0.35	0.41	0.46	0.28	0.34	1.55	3.39

Table 12: Calculating the maturity of the call.

Inputs	
Value of the underlying asset = S = Value of the firm (\$ million)	211893
Exercise price = K = Face value of debt (\$ million)	155307
Life of the option = t = weighted average duration of debt (in years)	3.39
Variance in the value of underlying assets = $\sigma^2$ = Variance in firm value <sup>1</sup>	3.66%
Risk-free rate = r = U.S. Treasury bond rate corresponding to option life	0.16%

Table 13: Final inputs into the Black-Scholes model.

The above inputs result in an equity value of \$63.799B, which translates to a basic price per share of \$16.06 which drops down marginally to \$15.93 when accounting for full dilution. These values are roughly 75% higher than the current market price and ones yielded by our DCF valuation.

When thinking about the reasons behind such a big difference, it is important to keep in mind the underlying mechanics at play here. First, the outputs of these two models are not independent as the DCF valuation is one of the inputs into the option valuation. Second, the Black-Scholes model makes certain assumptions about the prices (normally distributed), returns (lognormally distributed) and volatility (constant for the duration of the option) in the market, all of which make more sense when looking at the aggregate behaviour of the market but do not necessarily reflect adequately the nuances of every individual business and security. This lack of specificity is why the output of the Black-Scholes model here should be taken with a healthy dose of skepticism. It is, instead, best viewed as representing a right-tail outcome for the company.

## 5.6 Valuation using EV/EBITA multiple

To gain a more market-based perspective on Ford with respect to its peers, we valued it using the EV/EBITA multiples. On our choice of multiple, from (McKinsey & Company, 2015): -

“Using enterprise value to EBITA (or NOPLAT) rather than a P/E eliminates the distorting effect of different capital structures, nonoperating assets, and nonoperating income statement items (such as the nonoperating portion of pension expense). Any item that isn’t a helpful indicator of a company’s future cash-generating ability should be excluded from your calculation of the multiple.”

Company	EV/EBITA
Ford	65.52
GM	31.02
FCA	34.35
Volkswagen	42.30
Daimler	65.15
Toyota	77.40
Mean	52.62
Median	53.72
Ford EV = Median * EBITA	122.11
Less: Debt	-113.73
Equity (\$ billion)	8.38
Shares outstanding (in billion)	3.90
Price per share (\$)	2.15

Table 14: Valuing Ford using EV/EBITA multiple for 2020Q3.

This valuation stands firmly in contrast to the Black-Scholes one as it represents a left-tail outcome for the company, albeit one that is not as extreme as the one we considered in our sensitivity analysis during the DCF. However, despite having a different output, it suffers from the same weaknesses as that of the Black-Scholes, namely an overreliance on current market dynamics which in-turn reflect both systematic and idiosyncratic risks, and it is very difficult to separate them by just looking at current prices. Thus, it makes sense to take this value with a grain of salt too.

## 6 Conclusion

The three valuation frameworks yield an average price of \$9.22/share, which is very close to the DCF valuation of \$9.32/share. This, in our opinion, is a good sign, as it reflects the versatility of the intrinsic valuation methods and all the scenarios that they implicitly account for.

The proximity of these two figures means that our overall assumptions about Ford are reasonable and thus the DCF valuation represents the most plausible base case while the other two methods are pricing in some kind of right and left tail events. Such scenarios, while quite unlikely, would most probably be spurred on by some unknown unknowns if they ever do materialize. Trying to attach probabilities to such tail events is an exercise in futility.

Meanwhile, the sell-side analyst forecasts and ratings are (The Wall Street Journal, 2020): -

Scenario	High	Median	Low	Average
Price per share (\$)	12.00	9.00	7.10	9.19

Recommendations	Buy	Hold	Sell
No. of analysts	4	13	1

*Table 15: Sell-side analyst forecasts and ratings as of 2020Q3.*

This means that at the time of writing this report, most valuation professionals share our views as well.

Keeping all of this in mind, our final price target for Ford is **\$9.22/share** for the end of FY2021. Given its current market price of \$8.86/share, this represents a 4.06% upside, which constitutes a **‘Hold’** rating for the stock.

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## Appendix

## Reorganized financial statements

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
<b>Taxes</b>												
Taxes on EBITA												
Provision for income taxes	2881	2184	402	650	(724)	(201)	686	830	1060	1302	1459	1514
Tax shield on interest expense	1116	1297	1528	1083	1136	1136	1136	1136	1136	1136	1136	1136
Tax on non-operating income	(1415)	(682)	(1564)	(498)	41	41	41	41	41	41	41	41
Taxes on EBITA	2582	2799	366	1235	453	976	1863	2007	2236	2479	2636	2691
<b>Reorganized income statement</b>												
EBITA	9397	8541	8056	7133	4963	4647	8871	9557	10650	11802	12551	12814
Taxes on EBITA	(2582)	(2799)	(366)	(1235)	(453)	(976)	(1863)	(2007)	(2236)	(2479)	(2636)	(2691)
Change in deferred taxes	0	1993	(933)	132	(1558)	0	0	0	0	0	0	0
NOPLAT	6815	7735	6757	6030	2952	3671	7008	7550	8413	9324	9915	10123
Reconciliation with net income												
Net income	7373	4589	7731	3677	47	(755)	2582	3124	3987	4898	5489	5696
Add: Increase in deferred taxes	0	1993	(933)	132	(1558)	0	0	0	0	0	0	0
Add: Investments after tax	(1182)	(1157)	(781)	(97)	(25)	(25)	(25)	(25)	(25)	(25)	(25)	(25)
Add: Minority interests	(2)	11	26	18	37	0	0	0	0	0	0	0
Adjusted net income	6189	5436	6043	3730	(1499)	(781)	2557	3099	3962	4872	5464	5671
Add: Interest expense after tax	2073	2409	2837	4075	4273	4273	4273	4273	4273	4273	4273	4273
Income available to investors	8262	7845	8881	7805	2774	3493	6830	7372	8235	9145	9737	9944
Less: Non-operating income after tax	(1447)	(110)	(2124)	(1775)	179	179	179	179	179	179	179	179
NOPLAT	6815	7735	6757	6030	2952	3671	7008	7550	8413	9324	9915	10123
Check: NOPLAT	0	0	0	0	0	0	0	0	0	0	0	0
<b>Reorganized balance sheet</b>												
Working capital	34046	35097	41326	45115	39973	39317	46081	45998	46020	46831	47826	48823
Property, plant & equipment	30163	32072	35327	36178	36469	36458	33955	32876	31863	32378	33032	33714
Other assets net of other liabilities	65121	71087	76598	76798	74331	69513	81674	81722	81816	82378	84060	85806
Invested capital	129330	138256	153251	158091	150773	145288	161710	160596	159699	161587	164918	168342
Excess cash	32185	35791	35791	30744	31533	38482	22229	25394	28740	28348	26678	24978
Investments	3224	3304	3085	2709	2519	2519	2519	2519	2519	2519	2519	2519
Other non-current assets	4795	5656	8104	7929	10706	9739	10344	9231	8112	8248	8417	8592
Total investor funds	169534	183007	200231	199473	195531	196029	196803	197740	199070	200702	202532	204432
Equity	28751	29283	35704	36066	33230	31871	32645	33582	34912	36544	38374	40274
Deferred income taxes, net	(11007)	(9014)	(9947)	(9815)	(11373)	(11373)	(11373)	(11373)	(11373)	(11373)	(11373)	(11373)
Dividends payable	0	0	0	0	0	0	0	0	0	0	0	0
Adjusted equity	17744	20269	25757	26251	21857	20498	21272	22209	23539	25171	27001	28901
Post-retirement obligation	18096	18794	19130	18021	19096	19096	19096	19096	19096	19096	19096	19096
Interest-bearing debt	133694	143944	155344	155201	156435	156435	156435	156435	156435	156435	156435	156435
Adjusted debt	151790	162738	174474	173222	175531	175531	175531	175531	175531	175531	175531	175531
Total investor funds	169534	183007	200231	199473	197388	196029	196803	197740	199070	200702	202532	204432
Check: Investor funds	0	0	0	0	1857	0	0	0	0	0	0	0
<b>Free cash flow</b>												
Gross cash flow	6815	7735	6757	6030	2952	3671	7008	7550	8413	9324	9915	10123
Increase in working capital	0	(1051)	(6229)	(3789)	5142	656	(6764)	84	(23)	(811)	(995)	(996)
Capital expenditure	0	0	0	0	0	11	2503	1079	1013	(515)	(653)	(682)
Increase in other operating assets/liabilities	0	(7875)	(8766)	(1051)	2176	4818	(12160)	(48)	(94)	(562)	(1682)	(1746)
Gross investments	0	(8926)	(14995)	(4840)	7318	5485	(16422)	1114	897	(1888)	(3331)	(3424)
Free cash flow	6815	(1191)	(8237)	1189	10270	9156	(9414)	8664	9310	7436	6584	6699
Decrease/(increase) in excess cash	0	(3606)	(0)	5047	(2646)	(5092)	16253	(3164)	(3346)	391	1670	1700
Non-operating cash flow	2629	326	675	2423	(2740)	814	(758)	960	966	(290)	(322)	(328)
Cash flow to investors	9444	(4471)	(7563)	8660	4884	4877	6080	6460	6931	7538	7932	8070
Financing cash flow												
After tax interest expense	2073	2409	2837	4075	4273	4273	4273	4273	4273	4273	4273	4273
Decrease/(increase) in debt	0	(10250)	(11400)	143	(1234)	0	0	0	0	0	0	0
Decrease/(increase) in post-retirement obligations	0	(698)	(336)	1109	(1075)	0	0	0	0	0	0	0
Payment to minority interests	(2)	11	26	18	37	0	0	0	0	0	0	0
Decrease/(increase) in equity	3653	4057	1310	3315	2883	0	0	0	0	0	0	0
Dividends paid	0	0	0	0	0	604	1807	2187	2658	3265	3659	3797
Total financing cash flow	5724	(4471)	(7563)	8660	4884	4877	6080	6460	6931	7538	7932	8070
Check: Cash flow to investors = Financing cash flow	(3720)	0	0	0	0	0	0	0	0	0	0	0

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### Report recommendations

<b>Buy</b>	Expected total return (including expected capital gains and expected dividend yield) of more than 10% over a 12-month period.
<b>Hold</b>	Expected total return (including expected capital gains and expected dividend yield) between 0% and 10% over a 12-month period.
<b>Sell</b>	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

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